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work was devoted to large-scale work, which will permit of more exhaustive investigation of the economic geology. The earlier reconnaissance scale of about four miles to the inch has been practically discontinued for surveys in Alaska, as the more important regions have now been covered by such surveys. A little of this work was done, and less of it will probably be executed in the future as the whole of the general physiography of Alaska is developed.

One topographic party, accompanied by a geologist, made a reconnaissance survey of an extensive area of country along the Beaver Dam River, the resulting maps being on the scale of four miles to one inch, with a contour interval of 200 feet. Another party mapped about 400 square miles at the mouth of Copper River, on the scale of one mile to one inch. Another party mapped quite an area about Solomon, on Seward Peninsula, on the scale of one mile to one inch.

One of the results of the season's work, covering as it does with those of previous years the mapping of a large portion of Alaska, has been a careful revision of the area of Alaska. This is now found to be about 586,000 square miles, or about 4,000 square miles less than has heretofore been accepted.

GEOGRAPHICAL RECORD.

AFRICA.

The Duke of the Abruzzi going to Ruwenzori.—The *Bollettino* of the Italian Geographical Society (March, 1906) says that the Duke of the Abruzzi, with an expedition, will leave Italy in April for the Ruwenzori range in Africa, which he hopes to explore. He will be accompanied by Captain Cagni, Dr. Cavalli, naval Lieutenant Winspeare, Vittorio Sella, the renowned Alpinist and photographer, Mr. Botta, and the guides Fenouillet and son and Ollier. The party will proceed to Mombasa, where a caravan of 250 native porters will be formed to accompany the expedition to the Ruwenzori range. The expedition will reach Victoria Nyanza by the Uganda Railroad, and from the lake will travel on foot to the mountains. Here the Italian members of the party will leave the natives, who are not familiar with mountain regions and could scarcely endure the cold of the upper altitudes. After ascending the range and completing their explorations the European members of the expedition will probably go north to Albert Nyanza and descend the Nile to the Mediterranean. It is expected that the work will require about six months.

Mr. Freshfield's Attempt to Ascend Ruwenzori.—Mr. Douglas Freshfield, accompanied by Mr. Mumm, went to the Ruwenzori range last fall to attempt the ascent of these snow mountains. November was unfortunately very unfavourable for mountain-climbing and exploration. Mr. Freshfield says in his paper on this journey (*Alpine Journal,* Feb., 1906) that he was told by whites and natives in the neighbourhood that January and July are the only fine-weather months on the mountains. His attempted ascent was made from the Mubuku Valley, which is the easiest, and perhaps the only, route from the east to the highest part of the range. Rain was almost incessant, and the climb of 8,000 or 9,000 feet to the head of the Mubuku Valley was through a succession of morasses, precipitous mud-slides, and barricades of fallen trees. The earlier explorers on this route were stopped by a rock-face calling for the use of a rope. Mr. Freshfield's party, however, soon mastered this obstacle; but above it they were compelled to take to the glacier, and, after step-cutting for about an hour, found themselves on the verge of the uncrevassed upper slopes which led to the gap south of the highest peak. From distant views and photographs obtained of this upper region, Mr. Freshfield feels confident that there would be little difficulty for practised climbers above this point. A height of 14,500 feet was attained, when dense fog descended, and after twenty-four hours without change in the weather, the party retreated to the lower valley.

Mr. Freshfield says the highest summit is not, as has been supposed, the bold rock peak conspicuous from the upper Mubuku Valley, but a snowy summit more to the north. He thinks the highest point of the range does not exceed 18,000 feet, and that the extent of the snowy range has been exaggerated. He believes a circle twelve miles in diameter would include all the glaciers. Trees grow up to an elevation of 15,000 feet. He found the mountain tribes, the Bakonjo, to be excellent porters. They carried heavy burdens up the worst paths with skill and alacrity, and were willing, helpful, and intelligent. They can climb rocks, but they have had no experience with snow and ice.

STUDIES IN THE WESTERN SAHARA.—The French, early last year, investigated a large area in the Sahara west of the Tuat oases to about 6° 50′ W. only 112 miles from Tenduf, a former important centre of the slave trade but abandoned since 1903. The *Renseignements Coloniaux,* published by the Comité de l'Afrique française (1905, Nos. X *bis* and XII *bis*), contain a detailed account of this journey, which was made by Captain Flye Sainte-Marie and a small party. The route led through Igidi, a region of extensive sand-dunes, which had been invaded by marauding bands from the southern borderlands of Morocco. The object of the expedition was to cross the principal caravan routes extending north and south and to study the present political and economic position of this part of the desert with a view to future operations.

It was found that six caravan routes from Morocco cross this region to the Sudan, all of them uniting at Taodeni, to the north of Timbuktu. Three of the roads start from the Tafilet oasis, two from the Wadi Draa, and one, which was Dr. Lenz's route across the Sahara, from Tenduf. Five of the routes pass through three districts of Igidi which have pasturage and other advantages and lie within a zone only 170 miles in width. The command of these three districts will virtually control the whole of the caravan trade in the western Sahara. There is now very little trade, and not a human being was met during the journey of 1,200 miles. But Captain Flye Sainte-Marie believes that as soon as Igidi is protected from Moroccan robber bands these trade routes will again be utilized.

COLONISTS IN GERMAN EAST AFRICA.—*Der Tropenpflanzer* (March, 1906) prints a long circular issued by the Government of German East Africa, containing detailed information for the use of white colonists who desire to settle in the Kilimanjaro province. The Government says that colonists will enter this undeveloped field upon their own responsibility, and must expect to face privations common to pioneer life in new countries. But nature there is fairly bounteous, and although the prospect of acquiring large means is very slight, the diligent man may make a home for himself and become independent. The colonist should have a capital of at least $2,000, and married men are most desired. Most of the province consists of grassy steppe, with large and small areas of forest in the north near the mountains. The native population at the foot of Kilimanjaro is so large that European settlers can acquire very little acreage among them. The soil is generally fertile, but the settler should take only such land as has perennial running water. Allotments of land may be secured by lease at a cost of only a few cents per acre. As soon as the settler has one-tenth of his holding under cultivation or otherwise usefully employed, he will be entitled to purchase twice as much land as he has improved at one to two rupees a hectare. The circular intimates that good labour may be obtained among the natives, who, if well treated, will work faithfully for three rupees (75 cents) a month. The chief industries must be general agriculture and stock-raising. All the information needed by immigrants is found in the circular. This region is only about 200 miles south of the Equator, but its high elevation mitigates the tropical heat.

ONE OF THE HIGH PLATEAUX OF BRITISH EAST AFRICA.—Major A. St. Hill Gibbons recently read a paper before the Royal Geographical Society (*The Geog. Jour.*, March, 1906) on his study of the Guas Ngishu plateau in East Africa, in the early part of 1905, with a view to ascertaining its adaptability for European agricultural settlement. The information he and his colleague, Mr. Kaiser, obtained makes an important addition to our knowledge of this plateau, most of which stands 6,000 feet above sea-level. This is the western part of the high plateau region of British East Africa. He found nothing in the temperature of the Guas Ngishu to prejudice its colonization prospects. He believes that this, as well as other higher altitudes of this part of Africa, will be numbered among the admittedly healthy countries of the world, and that they will have considerable agricultural development. He found that the streams on the plateau flow so rapidly as to deprive the mosquito of his natural breeding conditions. There is almost total absence, also, of the rank river vegetation which this insect loves so well. The natural health conditions are excellent, and the disease-bearing mosquito and flies are absent. The soil in the valleys and lower-lying lands is excellent for agricultural purposes, but the country seems to be best fitted for cattle-raising and forest products. The plateau can support as many cattle as any similar area in Africa.

PROFESSOR KOCH ON THE SLEEPING SICKNESS.—Professor Koch is about to start on a second expedition to the northern coast of Victoria Nyanza for the purpose of making further studies of the *glossina palpalis,* the fly by which the infection of the sleeping sickness is conveyed to human beings, and of the possibility of prophylactic measures against the infection. He found on his first visit that the fly is on all the coasts of the Victoria Nyanza, although the sleeping sickness is chiefly confined to the northern coast.

AMERICA.

PHYSIOGRAPHY OF THE TACONIC MOUNTAINS.—In a recent *Bulletin* of the United States Geological Survey (No. 272, 1905), Professor T. Nelson Dale presents a rather full description and discussion of the physiography of a part of the Taconic Mountains in Western Massachusetts and Southern Vermont, illustrated by a number of excellent half-tones and sections from topographic maps. The history of the region is briefly as follows: First there was an accumulation in a broad arm of the ocean of a series of sediments which, together with a crystalline basement, were later thrown into a series of parallel folds, diminishing in altitude from east to west. There were three periods of folding: one at the close of the lower Cambrian; the second, more extensive, at the close of the Ordovician; and the third either in Devonian or Carboniferous time. Both faulting and metamorphism accompanied this folding. A long period of denudation reduced the series to great longitudinal ridges and valleys, and in some places stripped off the sediments, revealing the crystalline rocks of the ancient sea-floor. The last phase in the modification of the topography was that caused by the glacial invasion.

The effect of denudation on this mountain complex has been to introduce three prominent topographic types. The first of these, called the plateau type, includes the Green Mountain range, with its gently-undulating or roundish surfaces with few and usually not rugged elevations, but with its flank deeply incised. The Rensselaer plateau, a small westerly-inclined peneplain, is also classed with the plateau type.

The second type, called the Taconic, consists of alternating ridges and valleys, the ridges being cut by transverse and diagonal valleys, and sometimes intricately dissected.

The third type, the Hudson-Champlain, is less marked in character, consisting of minor, irregular elevations and depressions, but with a series of isolated hills reaching to nearly 700 feet above the general surface.

The plateau type is the result of the toughness of the crystalline rock, in which the effect of structure is of minor importance, the whole mass offering essentially uniform resistance to erosion. The ridge and valley (Taconic) type reflects the influence of variable degrees of resistance in the underlying rocks. This difference in rock structure also affects the vegetation, for the limestone of the valleys, even when covered with drift, possesses a more fertile soil than the schist areas. The latter, moreover, since they constitute the hill tops, are more rugged, bear less drift, and are prevailingly forest-covered, while the limestone valleys are more commonly cleared and tilled. R. S. T.

MARYLAND'S MAGNETIC SURVEY.—Volume V of the Maryland Geological Survey (1905) contains the second Report by Dr. L. A. Bauer on magnetic work in Maryland, summarizing all the results obtained thus far. The general field work has now been brought to a close. The operations hereafter will consist, on the part of the Coast and Geodetic Survey, in the reoccupying of certain stations known as "repeat stations," for the purpose of ascertaining the amount of annual change of the magnetic elements. With the aid of these results the magnetic maps of Maryland can always be brought up to date. The future work on the part of the State will consist in the delineation of the disturbed areas and the correlation of the magnetic disturbances with the geological formations. Dr. Bauer says that Maryland now possesses the most detailed magnetic survey of any country, with the exception of Holland. The magnetic survey of that kingdom embraces, on an average, one station to every forty square miles; that of Maryland, one to every 100 square miles; that of England, one to 139 square miles; and that of Missouri, one to every 438 square miles. In this list New

Jersey is not given, since only declinations were observed. The Report abounds with tabular statements of the results of the magnetic work to date. Maps of lines of equal declination, inclination, and horizontal intensity for Maryland, Delaware, and the District of Columbia are presented.

GROWTH OF SAND REEFS ALONG THE NORTH CAROLINA COAST.—Prof. Collier Cobb, of the University of North Carolina, has reprinted from the *Journal* of the Mitchell Society (Vol. XXII, No. 1) the "Notes on the Geology of Currituck Banks" which he wrote in the summer of 1904, when he made a careful examination of these banks from the Virginia line to Kittyhawk Bay and the Kill Devil Hills. The sand-reefs or banks along the North Carolina coast have grown steadily in length from the time of the earliest settlements, until there is now no inlet from Cape Henry to Oregon Inlet. The inlets through the Currituck Banks have been closed up by the steady southward march of the great barchanes or *médanos,* crescentic sand-dunes, known locally as whaleheads. These dunes are composed of singularly homogeneous blown sands, the horns or cusps of the barchanes pointing to leeward, which is almost due south:

> Following the ocean side of Currituck Banks, one may often see a distinct terrace marking the line between the Columbia sands and the Neocene clays; on stormy days comminuted Tertiary shells are washed up, and quite frequently after a storm one may pick up water-worn shells of *Cardium*, *Anomia*, and *Exogyra*, of which I brought away a score of specimens. These are distinctly Cretaceous forms. The facts go to show that the Banks are not of such recent origin as is usually supposed, but are of the same age geologically as the adjacent mainland.
>
> On the Atlantic side of this Currituck Bank I found numerous pebbles, some as much as three to four inches in diameter, buried in the upper sands and muds, some well rounded, others sub-angular, and some of these latter even striated. These pebbles are, almost without exception, unlike any of the stone of the mainland of North Carolina; and both their position and individual characters point to their glacial origin. It is clear that they are the work of the ice-sheet of the last glacial period, drifted southward by icebergs which stranded on the Carolina coast.
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> A rather rapid subsidence of the coast is now in progress; the blown sands and the silt, arrested by aquatic vegetation, are rapidly filling in the sound side of the Banks, and the water of the Currituck Sound has already become fresh since it has been cut off from direct communication with the sea, the inflowing streams having leached out the salt.
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> The Great Whaleshead barchane opposite Church's Island has moved southward three-quarters of a mile in twenty years, and the closing up of the sound has been so rapid as to bring about litigation in the courts for the possession of the new-made land. The subsidence of the land is so easily seen from beacons and telegraph poles as to be a matter of remark among the least observant of the inhabitants.

IMPROVING ROADS IN INDIANA.—State Geologist Blatchley, of Indiana, informs us that, during the past year, several of his assistants have continued the investigation of the road materials of Indiana. This work has been in progress for two or three years, and will form the main feature of the report for 1905. Every county in the State has been visited, and a study made of the available materials for improving roads. These are of two general classes—gravels and limestones. The gravels are much more widely distributed, and, in general, more available than the limestones. They are for the most part drift gravels, though many of them have been assorted and redeposited a number of times by streams.

In the southern third of the State are numerous deposits of gravel derived from the decay of the country rock. Those from the Knobstone or Waverly formation are mostly of iron carbonate, and roads constructed from them have proved very durable and smooth. The same is true of the gravels from the Harrodsburgh (Keokuk) limestone, which are largely composed of geodes and other fragments.

Six or seven different limestones are available in the southern half of the State for macadam purposes. In the northern half these are almost everywhere too deeply covered with drift. About sixty samples of limestone from various parts of the State have been sent to the U. S. Testing Laboratory at Washington, and the results of the tests will be incorporated in the report.

THE COURSE OF THE TENNESSEE RIVER.—The remarkable course of the Tennessee River, which leaves the broad, open Appalachian valley of Tennessee to cross the Walden Ridge near Chattanooga, has attracted the attention of physiographers, and has been the subject of several articles. Hayes and Campbell have proposed as explanation of the peculiar river course that the Tennessee was diverted from the old Appalachian valley by headwater capture and led across the Walden Ridge. Recently C. H. White (*Jour. Geol.*, Vol. XII, 1904, pp. 34-39) has stated objections to this theory, and D. W. Johnson, more recently still (*Jour. Geol.*, Vol. XIII, 1905, pp. 194-231), has brought forward facts which are opposed to it. Among the points made by Johnson are the following: The gorge across the Walden Ridge is winding, and its course is more in harmony with the theory of inherited meanders of a former period of base-levelling than with headwater capture. The Walden Ridge is breached in only this one place, whereas if headwater erosion had been in progress sufficiently to divert the Tennessee it would be expected that other small streams would have eaten backward far into the ridge. The divide south of Chattanooga has a form quite out of harmony with the theory of a former course of a large river across it. The stream which is supposed to have captured the Tennessee was tributary to a smaller stream than the Tennessee, and therefore, on the theory of capture, it must be supposed that a small river was able to capture a much larger one, which does not seem probable. The presence of gravels along the Tennessee and their absence in the Appalachian valley to the south is also opposed to the theory of Hayes and Campbell. Altogether, Johnson makes out a strong case in favour of the alternate theory, which White previously supported, that the course of the Tennessee is simply inherited from that of a former lowland state, and is not the result of river capture. R. S. T.

PROTECTING RUINS IN THE SOUTHWEST.—A bill is now before Congress the aim of which is to preserve the historic and prehistoric ruins of Arizona, New Mexico, Colorado, and Utah. Two years ago, Mr. Edgar L. Hewett wrote a report* on these ruins and their preservation in which he dealt at length with their distribution. He showed that the habitat of the prehistoric tribes of the southwest had been determined by the drainage systems, the great basins of the Rio Grande, the San Juan, the Little Colorado, and the Gila constituting the four seats of prehistoric culture of the so-called pueblo region. The remains of this ancient culture are of the three types—pueblo ruins, cliff houses, and cave dwellings. His map showed the most important ruins in the pueblo region. The information collated by Mr. Hewett is the basis of the proposed law for the preservation of the remains. It is well known that in recent years an extensive traffic has arisen in relics from these ruins, and, in securing relics, buildings, mounds, and other objects have been destroyed. These relics are priceless when secured by proper scientific methods, but of comparatively little value when scattered about in museums or private collections without accompanying records.

CORRECTION.—Dr. E. O. Hovey writes on the 29th of March:

> In lines 4 and 5 of "Geographical Notes on the Western Sierra Madre of Chihuahua, Mexico," page 84 of BULLETIN, Vol. 38, No. 2, *south* should read *north* and *north* should read *south*. This error must have been in the copy, but I cannot understand how I failed to see it.

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* Circular relating to Historic and Prehistoric Ruins of the Southwest and their Preservation. General Land Office, Washington, 1904.

ASIA.

AMERICAN TRAVELLERS IN CENTRAL ASIA.—Prof. W. M. Davis sends us the following extracts from letters lately received from two of his former students, now exploring the desert regions of Central Asia. The first part of their journey was made together. In the later months they have been travelling independently:

FROM MR. BARRETT.

DALAI KOURGAN, NEAR
KARA MUREN RIVER, CHINESE TURKESTAN, Dec. 16, 1905.

Our regular work began when we left Srinagar last spring, travelling by the trade route to Leh. From there we crossed the Chang La (pass) and went up the Shyok to the main route over the Karakoram, which we followed nearly to Suzet Pass. Here we diverged somewhat to the east, and crossed an easier pass by the smaller trail which led down to the Karakash. We then tried the Hindu tash pass to the north, but, failing there because of the very deep snow, descended the Karakash to the main trade route. We crossed the Sand-ju pass and descended a river and entered a district of the same name. We examined a number of valleys on our further way to Khotan. From there we went on to Nura by an easy trail between the Karakash and the Yurungkash. We examined the country very critically from Nura to the Kara-tash and from the head to the mouth of that river. Here Huntington and I parted company, and I went on by the trade route to Kiriya. Later I returned to the Kara-tash and did more work there and in a neighboring valley. After a second visit to Kiriya, I went to the ruined villages that Stein had seen, and thence eastward to Moldja and to my present stopping place.

From here I am planning to go eastward, with various side trips, and later on shall reach Lan Tchou, in the province of Kan-Su, by the southern trade route. . . . R. L. BARRETT.

FROM MR. HUNTINGTON.

CHERCHEN, CHINESE TURKESTAN,
Nov. 27, 1906.

. . . We are going to rest in this village of a thousand inhabitants for about a week. I am comfortably lodged in a cavernous chamber lighted by an eighteen inch hole in the roof and heated by a mud fireplace six inches wide and three feet high. It is really very comfortable here, compared with the fire in the sand, by which I slept a few nights ago, when I failed to find the caravan on returning from a trip along a belt of dying-out jungle, where I had ventured too far. The days are still bright and warm, 50° to 60° F.; the nights are cold, from 15° to 25°. Great preparations are in progress here for the feast of Bairam at the end of a month of fasting. . . .

The six weeks since I last wrote have been the very best of the whole journey. The evidence of old towns and of areas of dead vegetation seems to prove almost conclusively that there has been a steady desiccation of the Tarim basin throughout historical times. Evidence is also accumulating regarding the relation of the river courses, especially where they change from centripetal to peripheral courses, to the former shore lines of Lop Nor. . . . My men are a fine lot. They are as keen as I am in looking for old cities or rivers. Now one and now another comes with some story of a ruin which he has learned from the natives. I have five men, five camels, and eight horses; that may seem large, but I think it is the smallest caravan with which any explorer has ever come into this region. A good-sized caravan is a necessity, for one must be able not only to carry supplies for two or three months, but to run the caravan in two independent sections. During the last forty days the only people we have seen were a few shepherds. Most of this time I have been away from the main party, usually with two men and three camels, besides a local guide, looking for the ends of rivers far out in the sands. . . .

ELLSWORTH HUNTINGTON.

TOPOGRAPHY AND RAINFALL IN INDIA.—In a paper on "Some Geographical Peculiarities of the Indian Peninsula" (*Scot. Geogr. Mag.*, 1905, p. 459) the author, Cameron Morrison, points out that the position of the Western Ghats so near the windward coast of India has deprived the interior of much of the rainfall that would otherwise come to it. Most of the rainfall (over 100 inches in the year, on an average) flows down the western slopes into the sea, and is practically lost to agriculture except on a narrow strip along the coast. An interesting case of man's interference with nature in such matters is the successful attempt of the Madras Government to divert water from the western to the eastern slopes of the Western Ghats. At great expense one of the westflowing streams has been dammed, and, by means of a tunnel cut back through the hills to the east, the waters are led over to the eastern slopes of the mountains, and serve to irrigate a large tract on their leeward side. Thus, by man's skill, the heavy rainfall on the windward side becomes available on the leeward side, where the presence of the mountains has produced a deficient precipitation.

R. DEC. W.

THE PRESSURE AND RAINFALL CONDITIONS OF THE TRADES-MONSOON AREA.—In 1900, Mr. W. L. Dallas, of the Meteorological Department of India, discussed the seven monsoon seasons of 1893 to 1899. He showed that (1) the monsoon rainfall was deficient during the rising portions of a series of oscillations of pressure which occurred during these seven years, and in excess during the falling portions, the amount of rainfall variation agreeing directly with the rapidity of the pressure changes, and (2) that the pressure oscillations showed a periodicity of about four years. Lately, Mr. Dallas has carried his discussion further, in order to determine over what area the pressure oscillations extended, how they agreed in amplitude and in time throughout the affected area, and what relation the rainfall of the whole monsoon area bore to the pressure oscillations. The conclusions tentatively reached are as follows: (1) Four-year oscillations of pressure occur over the trades-monsoon area, most markedly over the equatorial belt. (2) During the rising portions of these oscillations the general rainfall of the trades-monsoon area is below, and during the falling portions is above, the average. There is a well-marked minimum of rainfall in the first year of the cycle, and a well-marked maximum in the third year. (3) At irregular intervals rays or streamers of varying extent and intensity emanate from the Antarctic or extreme southern regions, and these cause increased pressure over the affected area. (4) The rays or streamers affect large areas practically simultaneously, continue for considerable periods, and are apparently not in the least of the nature of waves. (5) When extensive, as in 1899 and 1900, the pressure is above normal, and exhibits large oscillations. When absent, as in parts of 1898-1899, the pressure is low and the oscillations are small. (6) These variations are superposed on the four-year cycle above mentioned, and are spasmodic, producing irregular variations of rainfall and irregularities in the pressure cycles. Satisfactory explanation of the four-year pressure cycle and of these irregular pressure disturbances has not been found as yet. The variations of pressure cannot be the result of variations of rainfall, for these variations are as marked in a dry as in a wet area, and the variations in pressure precede the variations of rainfall.—(*Proc. Amer. Philos. Soc., XLIV*, 1905.)

The interest which attaches to any such study of periodicity is peculiarly great in a region like India, where so much depends upon the time of occurrence, the distribution, and the amount of the monsoon rains. In India, as is well known, long-range forecasts, based upon thoroughly sound scientific principles, are regularly made in the case of the monsoon rains. Any light which can be thrown upon the controls of these rains will be of benefit to millions of people in that populous country, for the Indian meteorologists will at once use this knowledge in making their seasonal forecasts. R. DEC. W.

CLIMATE AND HEALTH IN THE PHILIPPINES.—A valuable investigation of the mortality statistics for the Philippine Islands, by Henry Gannett, occupies the greater part of Vol. III of the *Census of the Philippine Islands,* taken under the direction of the Philippine Commission in 1903 (Washington, 1905). With the increasing interest on the part of Americans in tropical hygiene, more and more attention will be paid to the study of the diseases of our tropical possessions and of their relation to weather and climate. The normal death-rate is given as 31.7, which is 82% greater than that of the United States (17.4 per thousand). It must be remembered, however, whenever tropical death-rates are under discussion, that the lack of proper sanitary precautions among tropical natives is usually sufficient cause for a much higher rate than that found in highly-civilized countries, where so much attention is paid to hygiene. Many other controls also affect the Philippine death-rate, as, for example, in the year 1902, when it was 63.3 per thousand, or just about double the normal. This excess, we are informed, was largely due to the prevalence of cholera, but other factors to be considered were the loss of crops through locusts, the loss of carabao, and the after-effects of the insurrection, which resulted in lowering the vitality of the natives through hardship, exposure, and want of food. At one time, when the United States first obtained control of the Philippines, it was officially stated, in a Government publication, that the death-rate among the American troops in the Philippines was no larger than the death-rate in an ordinary American city. The inevitable result of such a statement was the conclusion, on the part of our public, that residence in the Philippines, so far as general climatic conditions are concerned, was not attended by any higher death-rate than life in one of our cities. It was not apparent to the general public that it is absolutely illogical to draw any such conclusion from a comparison between the death-rate of American men, in the prime of life, selected for service in the Philippines, and many of them invalided home before they died, with the death-rate in an American city, based on the returns of deaths of all ages, of both sexes, and from all causes. It is, therefore, with especial care that the statement on pages 26-27 of this volume should be read:

> The death-rate of whites was 32 per thousand (1902). This, though only one-half of the death-rate of the brown people, must still be regarded as large, inasmuch as the white people in the islands are almost entirely adults in the prime of life; that is, in the class which commonly has the minimum death-rate. In the United States the death-rate of this class is much less than the above figure; and while probably the death-rate of the whites under Philippine conditions is greater than in their native country, it can scarcely be increased to this extent, especially since the sick are usually removed to the States or to Japan, if possible.

From a meteorological point of view, a series of diagrams showing the proportion of deaths from the various diseases by months is of especial interest. In 1902 the smallest number of deaths in any month was in February, from which time the number increased rapidly up to September, and then decreased. The smallest proportion of deaths occurred in the cool season (24.5%); 28.4% occurred in the warm season, and 47.1% in the wet season. As is the general rule, for the tropics as a whole, malaria, dysentery, and diarrhœal diseases cause a large proportion of all deaths. In the United States, on the other hand, deaths from the well-known "Temperate Zone" diseases—pneumonia, heart disease, and typhoid fever—are much more common than in the Philippines. Tuberculosis was the fourth disease in fatality in the Philippines in 1902. In the United States it is commonly the most fatal of all diseases. In the year 1902, deaths from cholera were at a maximum in September; from beri-beri in the wet season (August to October); from diseases of the stomach in the warm and wet seasons (April to September); from smallpox, in March, April and May (warm season). Tuberculosis showed little relation to weather. Bronchitis is least common in the cool season. Dysentery shows a distinct maximum in July, August, and September. More than half the deaths from this disease occurred in the wet season. From diarrhœa the deaths in the wet season were two-thirds greater than in the warm season, and two and a half times as great as in the cool season. It is a rather striking fact that the number of deaths from malaria was about the same during the cool months as during the warm months. R. DEC. W.

EUROPE.

THE NEW MAP OF FRANCE ON A SCALE OF 1:50,000.—The Commission centrale des travaux géographiques voted in 1898 to produce a new map of France on a scale of 1:50,000, or 0.7 statute mile to an inch, in colours, to be based upon resurveys on a scale of 1:10,000 and 1:20,000. It was decided that these surveys should not be reserved for the exclusive use of the army, but should be made also for the purpose of meeting the needs of science and industry. The topographic resurvey was begun in 1903. The Geographical Service now has the topographic surveys required for the publication of thirty-two sheets of the map on the scale of 1:50,000. Nine of these sheets, representing Paris and its environment, have been presented to the Chamber of Deputies, in the hope that the utility of the work will be appreciated and the necessary credit for carrying it out voted.—(Condensed from the *Bulletin de la Société de Topographie de France,* Dec., 1905.)

SHORTENING THE ROUTE BETWEEN ST. PETERSBURG AND THE SIBERIAN RAIL ROAD.—The new railroad between St. Petersburg and Vologda has been completed. The line from Vologda to Viatka is now building, and the construction of the direct line from Perm to Cheliabinsk has begun. These roads will make a shorter route between St. Petersburg and the Siberian railroad at Cheliabinsk, and will stimulate the export of Siberian grain by way of St. Petersburg. According to the *Board of Trade Journal,* the distance bettween St. Petersburg and Cheliabinsk will be 226 miles shorter than by the present route *via* Moscow. It will mean twelve hours saved for passenger traffic and over twenty-four hours for freight and a cheapening of freight rates of from 17 to 7 kopecks per pood. The shorter route will somewhat change the conditions of the Siberian export trade, and butter and game are likely to be despatched to St. Petersburg and Reval instead of, as now, to Riga and Libau.

POLAR.

MR. WELLMAN'S ARCTIC POLAR PROJECT.—Mr. Godard, of Paris, is building an airship for Mr. Walter Wellman, in which he will try to reach the North Pole. The expenses will be paid by the Chicago *Record-Herald,* of which Mr. Wellman is the Washington correspondent. The airship, which will be 164 feet long, 53 feet in its greatest diameter, and with a lifting power of 16,000 pounds, will carry five men, food for them for seventy-five days, motor boats, sledges, tools, etc., and 5,500 pounds of gasoline for the motors. The balloon will consist of three thicknesses of fabrics with three coatings of rubber, and, according to experts, it will approximate closely to gas tightness, though no means have as yet been found of making with fabrics an absolutely gas-tight reservoir. The outer rubber coating will be perfectly smooth, with nothing to hold moisture, snow, or frost. The motive power, composed of two motors driving two screws, will give speed of twelve to nineteen statute miles an hour. The men will have a comfortable car to live in. Mr. Wellman hopes to ascend from an easily-reached base of operation in northern Spitzbergen, the point of departure being only 550 geographical miles from the Pole. He will leave Norway for Spitzbergen in June, and expects to start on his air journey in August.

VARIOUS.

GLACIAL EROSION.—Those who still question the efficiency of ice as an important agent of erosion will gain small comfort from reading Prof. Davis' last contribution to that subject (*Scottish Geographical Magazine,* Vol. XXI, 1906, pp. 76-89), originally read before the Cape Town meeting of the British Association. His paper is a general discussion of glacial erosion, and so clear and convincing that it is difficult to believe that it can be carefully read without carrying conviction with it. The paper does not admit of an abstract; it must be read as a whole. And surely the great majority of readers must agree with the concluding sentence, that "The sculpture of mountains by glaciers is indeed now proved by so many facts, widely and yet systematically distributed, that it savours of extreme conservatism any longer to deny the efficacy of glacial erosion." R. S. T.

GEOGRAPHICAL CYCLE IN AN ARID CLIMATE.—The cycle of normal development of a river valley, for the full statement of which geographers are indebted to Prof. Davis, has been of immense value to the progress of scientific geography. In a recent number of the *Journal of Geology* (Vol. XIII, 1905, pp. 381-407), Prof. Davis has shown, by the deductive method, what the probable development of land-forms in an arid climate would be throughout a complete geographical cycle, and wherein it would depart from the cycle in a humid climate. In his paper he clearly shows how, in a region of interior drainage, the combination of stream erosion, deposit of waste, and wind action will cause the gradual reduction of the land-surface to a plain of high level, which he calls levelling without base-levelling. This result, first stated by Passarge in his description of the Kalahari Desert (Die Kalahari, Berlin, 1904), Prof. Davis calls Passarge's Law. Doubtless, owing mainly to the fact that arid regions have not been studied by geographers with the normal cycle of development of arid land-forms in mind, it is not now possible to cite illustrations of the many steps in this development; but the final stage of levelling, the arid land old age, seems to be clearly illustrated in the Kalahari region, where an extensive upland plain truncates a series of very diverse rocks, with only minor undulations where especially-resistant areas stand up above the general level as monadnocks. Prof. Davis adds that, in view of Passarge's Law, it is necessary to reconsider some of the cases of high-level peneplains, which may have been produced in an arid climate without the necessity of the theory of base-levelling and subsequent uplift; and he points out that this is necessary even in regions of present humidity, since, by climatic changes, humid regions of the present may formerly have been arid. This paper by Prof. Davis is an important contribution to physiographic literature. R. S. T.

WATER-VAPOUR AND NOCTURNAL RADIATION.—J. R. Sutton, meteorologist of the De Beers Consolidated Mines, Kimberley, South Africa, some years ago made a study of the relation between the minimum temperature at Kimberley and the absolute and relative humidities. A comparison was made between the fall of temperature between 8 P.M. and the succeeding minimum on every clear night throughout one year on the one hand, and the absolute and relative humidity at 8 P.M. on the other. The conclusion was that no certain connection could be traced between the dew-point at 8 P.M. and the fall of temperature, but there did not appear to be a uniform increase of range of temperature with a decreased relative humidity (J. R. Sutton: "Aqueous Vapor and Temperature," Symons's Met. Mag., Aug., 1895). During the past few years Mr. Sutton has been investigating this matter further, using as a standard the fall of temperature in one hour corresponding to the relative and absolute humidity at the beginning of the hour. It appears from his tables that the absolute and relative humidities are quite independent of each other in this inquiry; that there is no decided relationship between either element and the wind velocity, and that the relative humidity is the only element which shows a relation to the fall of temperature.—("The Influence of Water Vapour upon Nocturnal Radiation," *Sci. Proc. Roy. Dubl. Soc.,* XI, N. S., Aug., 1905.) R. DEC. W.

SYNCHRONOUS VARIATIONS IN SOLAR AND TERRESTRIAL PHENOMENA.—Under the foregoing title, H. W. Clough has recently (*Astrophys. Journ.,* XXII, 1905, 42-75) published the results of a somewhat extended investigation made by him, chiefly along the lines laid down by Brückner in his well-known work, *Klimaschwankungen seit 1700,* in which the evidence in favour of a cycle of about thirty-five years in certain climatic elements, such as temperature, rainfall, pressure, and so on, is very fully presented. An examination of the 36-year cycle in solar phenomena leads to the conclusion "that periods of maximum solar activity, characterized by a minimum length of the 11-year cycle, are followed 7 to 10 years later by terrestrial temperature minima, and 6 years thereafter by rainfall maxima; and that, coincidently with the low temperature, the activity of the general circulation reaches a maximum, and storm centres move with increased velocity and in lower latitudes." Further study of the 3½-year cycle in solar activity shows that the conditions which prevail at or shortly after the secondary maxima of solar activity in this cycle are identical with the conditions which exist in connection with the solar maxima in the 36-year cycle. The results are therefore mutually confirmatory. Increase in solar activity, both in short and long periods, produces an increased activity of the circumpolar whirls, forcing masses of cold air equatorward, and causing both low and high pressure areas to move in lower latitudes and with increased velocity. Again, variations in solar activity in a 300-year cycle seem to be associated with variations in the length of the 36-year cycle, ranging from 30 to 45 years, and there are similar variations in the length of the 11-year cycle. Thus there appears to be a close connection between variations in solar and terrestrial phenomena in 300-year, 36-year and 3½-year cycles. R. DEC. W.

THE MAGNETIC SURVEY OF THE PACIFIC OCEAN.—We learn from Dr. L. A. Bauer that the yacht *Galilee,* which is engaged in the magnetic survey of the Pacific Ocean under the auspices of the Carnegie Institution, Washington, left San Diego on March 2d to begin her second cruise. It will be recalled that her first cruise last fall was from San Diego around the Hawaiian Islands and back to San Francisco. On her present journey she is expected to make about 20,000 miles by the end of the year, visiting the waters of Fanning Island, Samoa, Fiji, the Marshall Islands and Guam, Yokohama, the Aleutian islands and back to San Diego. Several members of the former staff were obliged to return to their official duties, and the command of the vessel was accordingly entrusted to Mr. W. J. Peters, formerly of the astronomical and topographical corps of the

U. S. Geological Survey. Mr. Peters, while with the second Ziegler Polar Expedition, made a valuable series of magnetic, meteorological, and tidal observations at Teplitz Bay, Franz Josef Land. The other members of the staff are Messrs. J. C. Pearson, formerly Instructor of Physics in Bowdoin College, and J. P. Ault, magnetic observers, and Dr. H. E. Martyn, surgeon and recorder. Sufficient funds have been allotted to permit carrying on the work throughout the year.

According to a dispatch received early in April, the *Galilee* arrived safely at Fanning Island on March 31, having accomplished the trip of 3,500 miles from San Diego in 29 days, besides executing successfully magnetic work along the entire cruise.

NOTES.—THE PARIS GEOGRAPHICAL SOCIETY has awarded one of its gold medals to Major C. H. D. Ryder for his work as surveyor and explorer and his expedition to the sources of the Brahmaputra, in connection with the recent Tibet Mission.

THE CARNEGIE INSTITUTION is said to have purchased a tract of six acres in the northwest section of Washington, where it will erect a permanent home. The site is near the building of the United States Bureau of Standards, and overlooks the entire city. The price paid was $35,000 an acre, and a building to cost $100,000 will be erected at once.

A. HARTLEBEN'S Statistische Tabelle for all countries has appeared for 1906, with the latest official information as to the density of population, state finances, commerce, communication, weights and measures, army and navy, large cities, etc. All these facts are tabulated on one sheet, 39 by 28 inches in size. The "Kleines Statistisches Taschenbuch," by the same firm, gives all this information in a neat little volume of 104 pp. that may be slipped into a side pocket, and is sold for M. 1.40.

PROFESSOR C. W. HALL, of the University of Minnesota, is writing a geographical guide to the towns and cities of the State. It will be published during the year by the Geographical Society of Minnesota, which held its second annual meeting at the State University of Minneapolis on Dec. 26 last. In the past year the Society had four field days.

PROF. HEINRICH RIES, whose book on the "Economic Geology of the United States" has recently appeared, completed last year a report on the clay industries of Wisconsin, which was recently sent to press by the Geological and Natural History Survey of that State.

DR. A. J. HERBERTSON, Reader in Geography at Oxford, has been appointed by King Edward as the scientific member of the Royal Commission which has just been chosen to inquire into the condition of the canals and other inland navigation of the United Kingdom.

AMERICAN GEOGRAPHICAL SOCIETY—TRANSACTIONS, MARCH, 1906.—A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, March 20, 1906, at 8.30 o'clock, P.M.

Vice-President Moore in the chair. The following persons, recommended by the Council, were elected Fellows:

C. G. Rothschild.
Lewis A. Platt.
Carl C. Shippee.
Edmund H. Sears, 2nd.
Charles Henry Davis.
Anna Eaton Collins.
George Gilbert Entz.
Jesse R. Grant.

Edward G. Peters.
Edwin S. Townsend.
James J. Sheppard.
Murray M. Shoemaker.
Dwight A. Jones.
Paul J. Sachs.
Frederick G. Morgan.
Arthur W. Stevens.
Arthur Edward Spohn.
Edward A. Sumner.
Rush Sturges.
Henry N. Sweet.
Charles Hamot Strong.
Walter W. Shaw.
William M. Chadbourne.

The Chairman then introduced Prof. Albert Perry Brigham, who addressed the Society on the Fiords of Norway. Stereopticon views were shown.

On motion, the Society adjourned.

EXHIBITION OF MOUNTAIN VIEWS.—The collection of Signor Sella's photographs of the Alps, the Caucasus, the Himalayas, the Saint Elias range, and Mount Etna, lent to the Society by the Appalachian Club of Boston, was opened to the Fellows and the public in the Society's house, 15 West Eighty-first Street, for the four weeks ending March 14.

NEW MAPS.

AFRICA.

BRITISH EAST AFRICA.—Map of East Africa Protectorate. Scale, 54 statute miles to an inch. Prepared by the Public Works Department, Mombasa, 1906.

This excellent map accompanies the "Hand-book for East Africa, Uganda, and Zanzibar for 1906." It shows in colours the seven provinces into which the southern part of the Protectorate has been divided. The northern portion has not yet been organized. The headquarters of provinces and districts and military and railroad stations are indicated.

EGYPT.—Geological Map of the Fayum Depression. Scale, 1:250,000, or 3.95 statute miles to an inch. Survey Department, Cairo, 1905.

This map is based upon the Geological Survey operations which were begun in 1898 in the desert surrounding the Fayum. The Fayum is a large circular depression in the Libyan Desert west of the Nile and to the south of Cairo. The depression contains about 12,000 square kilometers, and is divisible into cultivated land, lake, and desert, as shown in the map which accompanies a report on the "Topography and Geology of the Fayum Province."

AMERICA.

U. S. GEOLOGICAL SURVEY.

Reclamation Projects, Gaging Stations and River Surveys. Scale, 115 statute miles to an inch. Washington, 1905.

Accompanies the third annual Report of the Reclamation Service. Shows the principal reclamation projects, the areas within which public lands have been reserved for irrigation, projects under construction, approved, or under investigation, river gaging stations and river surveys. The Report also includes